REMARKS

Claim for priority

The Office Action Summary of the Office Action mailed August 2, 2006 indicated that acknowledgment was made of a claim for foreign priority under 35 U.S.C. 119 and that none of the certified copies of the priority documents had been received.

The Office Action mailed April 6, 2007 and the present Office Action do not indicate any further status regarding foreign priority under 35 U.S.C. 119 and the certified copies. Applicants respectfully request that the status regarding foreign priority under 35 U.S.C. 119 and the certified copies be indicated in the next Office Action.

Claim rejections under 35 U.S.C. 103(a) as being unpatentable over EP '744 taken with JP '153

Claims 1-20 have been rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1 216 744 A1 ("EP '744") taken with Japanese Application 10249153 ("JP '153"). Applicants respectfully traverse the rejections. Reconsideration and withdrawal of the rejections are respectfully requested in view of the amendments and remarks.

Applicants reiterate and incorporate herein by reference all arguments and discussion made in Applicants' Amendment and Response under 37 CFR 1.111 filed on January 18, 2007.

Applicants also reiterate and incorporate herein by reference all arguments and discussion made in Applicants' Amendment and Response under 37 CFR 1.111 filed on September 26, 2007.

As indicated previously in Applicants' Amendment and Response under 37 CFR 1.111 filed on January 18, 2007, EP '744 column 1, lines 5-6, discloses that the present invention relates to the recovery of carbon dioxide from gaseous streams containing it. EP '744 column 5, lines 52-56, discloses that CO_2 recovered from flue

gas or other feed streams using the above process can be directly used as vapor for onsite applications. Several CO_2 applications such as pH control of wastewater can use CO_2 vapor directly from the absorption process.

Applicants suggest that there is no suggestion or motivation to modify EP '744 to contact the carbon dioxide stream with silicate particles dispersed in an aqueous solution in a mineral carbonation zone said silicate particles being a bivalent alkaline earth metal silicate as described, for example, in Applicants' independent claims 1 and 19. Applicants suggest that the Office Action is using improper hindsight based on Applicants' invention to modify EP '744 to contact the carbon dioxide recovered in the EP '744 process with silicate particles.

Applicants also suggest that the heating in the EP '744 process is generally provided by heat exchanger 10 and reboiler 21. EP '744 column 4, lines 16-22, discloses that the CO_2-rich stream in line 9 is then heated in a countercurrent heat exchanger 10 by the hot regenerated or lean absorbent stream 29 to a temperature of 100 - 110°C and is subsequently fed via line 11 to the top of the stripper 12. Alternatively, this stream can be heated before it is compressed in pump 8. EP '744 column 5, lines 17-23, discloses that the solvent 20 from the bottom of the stripper 12 is heated indirectly in the reboiler 21, which typically operates at a temperature of around 119 - 135°C. Saturated steam 48 at a pressure of 30 psig or higher can provide the necessary heating. The heated solvent vapor 22, which is primarily steam, is recirculated to the stripper. EP '744 column 5, lines 24-26, discloses that the stripped carbon dioxide-lean absorbent solution 23 from the reboiler is pumped back by the lean solvent pump 35 to the heat exchanger 10.

Applicants suggest that there is no suggestion or motivation to modify EP '744 and the heating described in EP '744 to contact the carbon dioxide stream with silicate particles and to utilize the heat released in the contacting of the carbon dioxide stream with silicate particles to provide heat for heating the carbon dioxide-containing solvent as described, for example, in Applicants' dependent claims 2 and 3 and independent claim 19.

The Office Action at page 2, concerning claim 2, indicates that using heat exchange is an obvious expedient to optimize economic efficiency by reducing heating costs. Applicants respectfully traverse the Office Action statement and

suggest that such statement is based on improper hindsight based on Applicants' claimed invention.

Applicants also suggest that there is no motivation or suggestion to modify EP '744 to route the product CO_2 stream, for example, EP '744 product CO_2 stream 16, to a contacting with silicate particles to release heat and then using the heat released to provide heating of the CO_2-enriched liquid absorbent stream, for example, EP '744 CO_2-enriched liquid absorbent stream 7. Applicants also suggest that the EP '744 emphasis of utilizing a heat exchanger and a reboiler prevents one skilled in the art from having a reasonable expectation of success of modifying EP '744 in such a manner.

Applicants also suggest that EP '744, alone or in combination with JP '153, does not teach or suggest all the claimed features of Applicants' claims, for example, that the heat released in step (c) is used in step (b) (Applicants' dependent claim 2) or, for example, that at least 50% of the heat needed for step (b) is supplied by the heat released in step (c) (Applicants' dependent claim 3), or, for example, regarding step (b), that at least 50% of the heat needed is supplied by the heat released in step (c) (Applicants' independent claim 19).

As indicated previously in Applicants' Amendment and Response under 37 CFR 1.111 filed on September 26, 2007, EP '744 column 5, lines 52-56, discloses that CO_2 recovered from flue gas or other feed streams using the above process can be directly used as vapor for onsite applications. Several CO_2 applications such as pH control of wastewater can use CO_2 vapor directly from the absorption process. EP '744 column 6, lines 9-12, discloses that alternatively, the CO_2 recovered from flue gas or other feed streams using the chemical absorption process may need to be compressed for downstream recovery or sequestration. Applicants suggest that EP '744 discloses that CO_2 may be sequestered, but does not indicate the type of sequestration that may be used or that a sequestration may include a generation of heat.

JP '153, paragraph 0002, discloses that candidate methods that have been considered presently for the effective fixation of CO_2 include: methods for synthesis of organic substances (e.g., methanol and the like) by reaction of CO_2 and H_2; methods for using CO_2 in artificial photosynthesis; methods for disposal by increasing

concentration and liquefaction of CO_2 and injecting into the deep sea; methods of disposal of CO_2 by compression and storage within the earth in depleted oil fields, gas fields, etc.; and the like. Applicants suggest that a person skilled in the art will know that sequestration processes may include processes other than mineral carbonation.

JP '153, paragraph 0015, discloses that the reaction of this invention between CO_2 and the substance that contains at least calcium silicate and/or magnesium silicate proceeds according to the above mentioned reaction of Urey and that this reaction proceeds sufficiently in the vicinity of room temperature due to the fine size of the powder and due to addition to the system of the chemical substance that generates acidity or alkalinity. However, the reaction rate increases with increasing temperature, and the temperature of the suspension solution is preferably greater than or equal to 30°C. Applicants suggest that the JP '153 disclosure at paragraph 0015 suggests an endothermic reaction.

Applicants suggest that a person skilled in the art with knowledge of EP '744 would not include a mineral carbonation because there are many possible sequestration processes. Further, Applicants suggest that of the many possible sequestration processes available, mineral carbonation may be one of a few that would provide a benefit of a possible heat integration.

The Office Action mailed April 6, 2007 at page 2 indicated that it is an obvious expedient to exchange heat between endothermic and exothermic processes. The Office Action mailed April 6, 2007 at page 2 further indicated that if regulations do not permit off-gassing of CO2, then it is an obvious expedient to handle the waste in a legal manner; food grade CO2 may be sold for beverages instead of being put into the air or ground, for example. Applicants respectfully traverse the April 6, 2007 Office Action statements and suggest that such statements are based on improper hindsight based on Applicants' claimed invention.

The present Office Action at page 2 indicates that it is an obvious expedient to use heat from one step if it is needed in another step, particularly under the rubric of energy conservation and 'going green'. The present Office Action at page 2 further indicates that the examiner agrees that the present process is relatively inefficient versus for example direct adsorption of gas by a solution of CaO. The present Office Action at page 2 further indicates that however, this does not detract from the

combination of references to meet what is claimed. Applicants respectfully traverse the present Office Action statements and suggest that such statements are based on improper hindsight based on Applicants' claimed invention. Applicants also suggest that if combining EP '744 and JP '153 results in a process that is relatively inefficient versus for example direct adsorption of gas by a solution of CaO, then one skilled in the art would not look to combine EP '744 and JP '153.

CONCLUSION

Applicants respectfully request reconsideration and withdrawal of the claim rejections under 35 U.S.C. 103(a). Applicants further respectfully request entry and consideration of the above remarks to advance the above-identified application to allowance.

Respectfully submitted,

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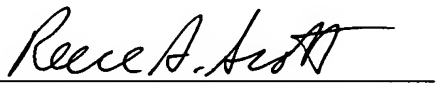

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